Miscellaneous Organic NESHAP Compliance for a New Countermeasure Flare Production Facility at the Milan Army Ammunition Plant

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Presentation Outline

- Project Overview and Regulatory Considerations
- Permitting Approach
- Miscellaneous Organic NESHAP (MON) Implementation
- Selection of Air Pollution Control Technology
- Conclusion

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Project Overview and Regulatory Considerations

- Project executed as part of Armament Retooling and Manufacturing Support (ARMS) Program
- Renovation of existing energetics manufacturing process line
- Design and build facility to manufacture countermeasure flares for armed forces

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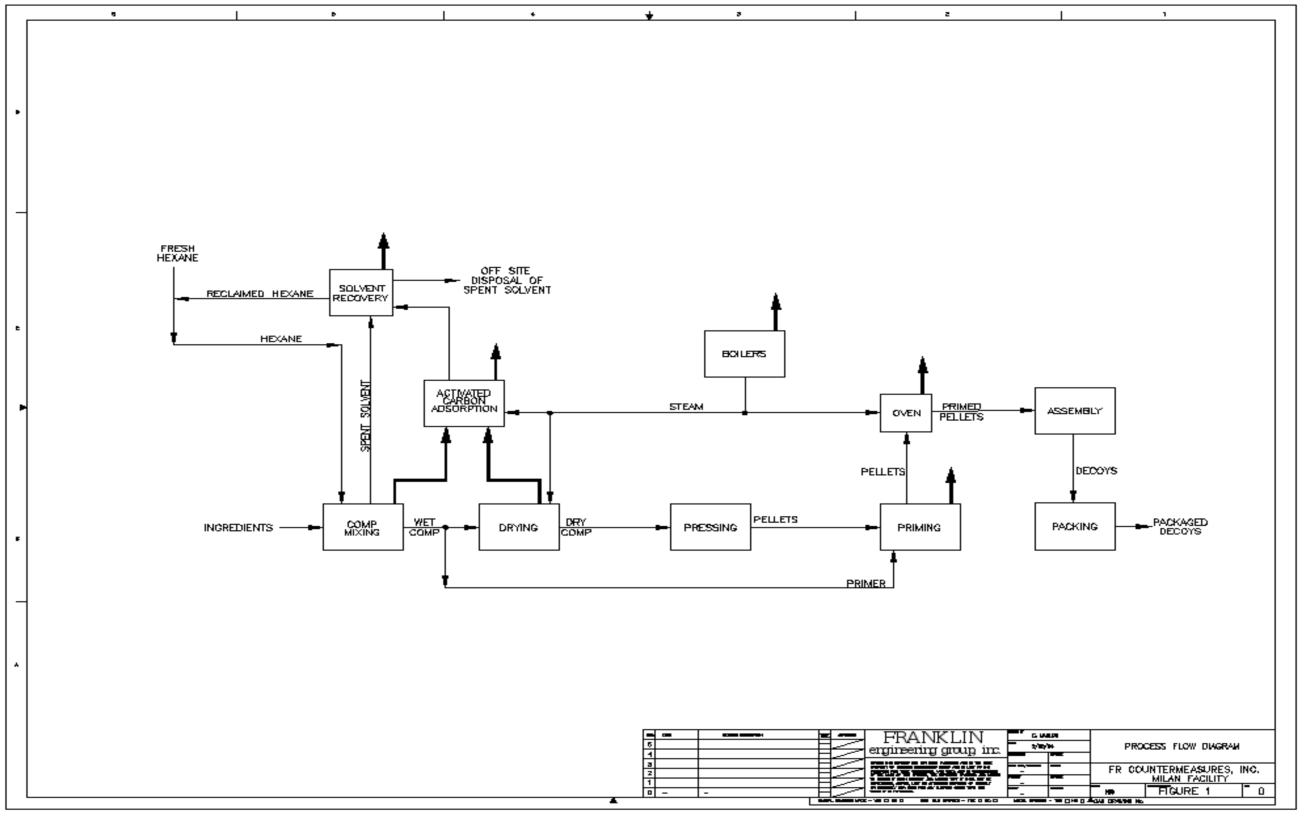
Project Overview and Regulatory Considerations
Simplified Process Schematic



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Project Overview and Regulatory Considerations

- Solvents utilized in manufacturing process:
  - Hexane – VOC and HAP
  - Acetone
    - Solvents must be recovered and reused
- Other raw materials:
  - Magnesium – safe processing considerations
- MON – proposed on April 4, 2002
- Construction to begin in 4th quarter 2002

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Permitting Approach

MON/NSR Issues

- MON applicability:
  - MON applicable as proposed
  - US EPA considering energetics manufacturing subcategory
- MCPU was Group 1 Batch Process:
  - 98 % reduction of HAPs using control device
  - 95 % reduction of HAPs using recovery device
- Additional consideration was New Source Review (NRS) threshold of 40 tpy VOC

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Permitting Approach (cont'd)

Final Approach

- Design, build and operate facility to meet proposed MON requirements for control of organic HAP emissions
- Permit as Conditional Major Source at reduced manufacturing rate:

  < 10 tpy HAP emissions

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Additional Site-Specific Permitting Considerations

- Meet discharge limits for on-site WWT Plant
  - Acetone in WW was significant issue
- Utilization of existing open burning facility for disposal of energetic waste
- Utilization of existing treatment facility for WW potentially contaminated with energetic

MON Implementation

- Reduction of HAP emissions from batch process vents greater than 95 % using recovery device
  - Control of comp mixing and drying vents > 95 %
  - Required monitoring for recovery device
  - Compliance testing requirements
- MON storage tank requirements
- MON WW requirements
- LDAR program implementation

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Selection of Air Pollution Control Technology

Technology	Screening Comments	Further Study
Refrigeration	Solvent concentration in vent gas too low, cost high	No
Absorption	No viable scrubbing medium	No
Activated Carbon Adsorption	Viable candidate	Yes
Thermal Oxidation	Compared to other oxidation technologies	No
Catalytic Oxidation	Compared to other oxidation technologies	No
Regenerative Thermal Oxidation (RTO)	Compared to other oxidation technologies	Yes [a]
Polymeric Adsorption	High initial cost	No

[a] RTO process most cost effective option of thermal oxidation alternatives

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Evaluation of Potential Air Pollution Control Technologies

	Activated Carbon Adsorption	Regenerative Thermal Oxidization
Advantages	Recovery of solvent for reuse	Lower capital cost
	Handles spikes in VOC concentration	No wastewater
	Works well with batch or continuous processes	
	Potentially lower operating cost	
	Can easily be expanded to address additional flow	
Disadvantages	Treatment cost of wastewater stream	Does not handle significant spikes well
	Cooling tower required	Continuous flame may be considered unsafe
	Flexibility for future solvents	Not expandable
		Continuously sequencing valves high maintenance

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Evaluation of Potential Air Pollution Control Technologies

Overriding Design Issues – SAFETY FIRST

- Thermal oxidation considered only if safety issues could be addressed
- Design for immediate isolation of process steps to prevent propagation through ductwork
- Minimize potential for energetic buildup in ductwork

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Evaluation of Potential Air Pollution Control Technologies

Final Control Technology Selection

- Steam available for carbon regeneration step
- Recovery and reuse of solvents (acetone and hexane)
- Potential exothermic reactions with acetone (required water quench system for carbon beds)
- Readily available disposal of WW after clean-up steps
- Flame isolation valves with a gas cartridge actuator to eliminate flame/deflagration passage
- Costs for carbon adsorption and RTO comparable

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Evaluation of Potential Air Pollution Control Technologies

Activated Carbon Adsorption System and Auxiliary Units

- Preconditioning (vent gas cooling)
- Three fixed bed carbon adsorbers
- One bed is regenerated with steam while other two on-line
- Designed to readily allow for expansion

- Decanter for organic/aqueous separation
- Organic fraction – water wash step followed by distillation for hexane recovery
- Aqueous fraction – steam stripping column for acetone recovery

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Conclusions

- Energetics facilities have unique challenge determining compliance options for MON
- Final control device and design decisions must account for all site-specific considerations

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Carbon Adsorption System

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Process Ductwork

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Questions?

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